Having described the invention, the following is claimed:

1. A vapor decontamination system for decontaminating a defined region, said system comprising:

a chamber defining a region;

a generator for generating vaporized hydrogen peroxide from a solution of hydrogen peroxide and water;

a closed loop circulating system for supplying said vaporized hydrogen peroxide to said region;

a destroyer for breaking down said vaporized hydrogen peroxide;

a sensor downstream from said destroyer operable to sense moisture in said system and provide electrical signals indicative thereof; and

a controller operable to determine the presence of vaporized hydrogen peroxide in said region based upon said electrical signals from said sensor.

2. A vapor decontamination system as defined in claim 1, wherein said sensor is a humidity sensor.

3. A vapor decontamination system as defined in claim 1, wherein said controller is operable to determine the concentration of vaporized hydrogen peroxide in said region based upon said electrical signals from said sensor.

4. A vapor decontamination system as defined in claim 1, wherein said generator is a vaporizer.

5. A vapor decontamination system as defined in claim 1, further comprising:

a blower within said closed loop circulating system, said blower operable to circulate air through said closed loop circulating system;

a dryer disposed within said closed loop circulating system between said destroyer and said generator, said dryer operable to remove moisture from said circulating system; and

a heater within said closed loop circulating system upstream from said generator for heating air flowing through said circulating system.

6. In a decontamination system for decontaminating a region, said system having a generator for generating vaporized hydrogen peroxide, a closed loop system for supplying the vaporized hydrogen peroxide to said region and a destroyer for breaking down the vaporized hydrogen peroxide, a sensor for detecting the humidity

in said system downstream from said destroyer, and a controller for determining the presence of vaporized hydrogen peroxide in said region based upon data from said sensor.

7. A decontamination system as defined in claim 6, wherein said controller is operable to determine the concentration of hydrogen peroxide in said region.

8. A decontamination system as defined in claim 7, wherein said sensor is a humidity sensor.

9. A method of determining the presence of vaporized hydrogen peroxide (VHP) in a region, comprising the steps of:

providing a sealable region having an inlet port and an outlet port, and a closed loop conduit having a first end fluidly connected to the region inlet port and a second end fluidly connected to the region outlet port;

re-circulating a flow of a carrier gas into, through and out of said region and around the closed loop conduit;

delivering vaporized hydrogen peroxide into the re-circulating carrier gas flow upstream of the region inlet port;

destroying the vaporized hydrogen peroxide at a first location downstream from the region outlet port;

monitoring the temperature and humidity at a second location downstream from said first location; and

determining a presence of vaporized hydrogen peroxide in said region based upon the humidity readings at said second location.

10. A method as defined in claim 9, wherein said carrier gas is air.

11. A method as defined in claim 9, wherein said destroying step includes catalytically decomposing the hydrogen peroxide vapor into water and oxygen.

12. A closed loop, flow through method of vapor phase decontamination in a sealable chamber or region having an inlet port and an outlet port, and a closed loop conduit fluidly connecting the outlet port to the inlet port, the method comprising the steps of:

re-circulating a flow of a carrier gas into, through and out of the chamber, and through the closed loop conduit;

supplying vaporized hydrogen peroxide into the re-circulating carrier gas flow;

destroying the vaporized hydrogen peroxide to form water and oxygen at a first location downstream from said outlet port;

monitoring the relative humidity at a second location downstream from said first location; and

estimating the concentration of vaporized hydrogen peroxide in said region based upon the relative humidity at said second location.

13. A closed loop, flow through method as defined in claim 12, wherein said carrier gas is air.

14. A closed loop, flow through method as defined in claim 12, wherein said destroying step includes catalytically decomposing the hydrogen peroxide vapor into water and oxygen.

15. A closed loop, flow through vapor phase decontamination system, comprising:

a sealable chamber having an inlet port and an outlet port;

a closed loop conduit system having a first end fluidly connected to said inlet port and a second end fluidly connected to said outlet port;

a blower connected to said conduit system for re-circulating a carrier gas flow into, through and out of the chamber;

a vaporizer for delivering vaporized hydrogen peroxide into said carrier gas flow upstream of said inlet port;

a destroyer downstream of said outlet port for converting the vaporized hydrogen peroxide in water and oxygen;

a sensor downstream of said destroyer for detecting humidity; and

a processing unit for monitoring the humidity level downstream of said destroyer and determining the concentration of vaporized hydrogen peroxide in said chamber based upon said humidity level.